

INTRODUCTION

Tin ore was discovered at Cox Bight by the late Lachlan Macquarie in the early nineties. Shortly after the discovery was made known miners Glover and Foley visited the area and carried out extensive prospecting operations. On their return to Hobart a company was formed to arrange for the thorough exploration of the deposits in the western part of the area. That company failed in their attempt to explore the deep alluvial ground, and they found that the shallow hillside deposits were not of any great economic importance. Of late years parties of miners have been engaged in sluicing the higher terraces of gravels and detritus not, however, with marked success.

In 1913 a Melbourne company undertook the work of exploring the western alluvial flats and carried out their plan in part with fair results. The work was stopped owing to trouble with neighbouring lease-holders, and was not resumed by them.

Nothing worthy of record took place until 1926 when M.R. Freney, on behalf of an Adelaide Company, visited the field and pegged a large area of ground in the names of his principals. The subsequent history of development is written in the records of the works performed by these Adelaide Companies. It is not necessary to give an account of their performances, but it may be stated that, as regards our knowledge of the value of the deposits, no real advance has been made by them. In making that statement the writer wishes it to be understood that he is fully aware of the many difficulties to be overcome in the preliminary operations, and that the Companies are now preparing the way for active development.

Greater progress might have been made had not an option been granted to Tin Options Ltd. of Melbourne, who contracted to explore the deposits by drilling. If current reports be true, that Company's engineer did not test the full depth of the ground at any point. The drill in use was unsuitable for the purpose, and not one of the shafts was unwatered for an examination of the beds of alluvium.

The natural division of the field into two areas probably led to the formation of two distinct companies: one (Cox Bight Tin Sluicing Coy. N.L.) to work the eastern deposits, the other (Bathurst Range Tin Mining Coy.) to work the western ground. Actually, the total area of deep ground - assuming that the deposits contain tin ore in profitable proportion - is sufficient only for one company. However, the geographical division into an eastern and a western area is convenient for purpose of description.

SITUATION AND ACCESS.

Cox Bight Tinfield lies along the mid-southern coast of Tasmania and is about five miles in length and not more than one mile in width. The actual length, and width of workable ground are very much less; but tin ore occurs in places throughout the whole area. Moreover, an extension of this field has recently been discovered by P.B. Nye Government Geologist, about five miles northward on the south-east side of Bathurst Harbour. The only part of concern in this investigation is a narrow strip fronting the coast.

An examination of the map of Tasmania shows at the south an almost unbroken coast line, not one deep indentation.

At the south-west, however, is the long inlet of Port Davey, extending inland within eight miles of Cox Bight settlement. Port Davey is accessible to vessels of very large tonnage, and provides a safe anchorage in all weathers. Between Port Davey and Cox Bight is a low pass, rising not more than 100 feet above sea-level, through which a track has been marked and a survey made for a roadway. That is the natural route and Port Davey is the natural harbour for ships trading to this part of the island. In calm weather, however, goods may be landed from lighters at Cox Bight.

The cheapest and best vehicle for the transport of material from Port Davey to Cox Bight would probably be the caterpillar tractor. Tramway connection would cost at least £700 per mile, in addition to which a large sum would be required for rolling stock.

Provision has not been made for a way of access by land.

TOPOGRAPHY

The deposits of this field occupy an old littoral from which the sea has in recent geological time receded about 20 chains. It is bounded on the sea-side by high sand-dunes and on the other side by steeply sloping mountains of granite, quartzite, and quartz schist. One of the most prominent, though not the highest, peaks is that known as Foley Pimple which rises 1175 feet above sea-level in less than half a mile from the plain. On the background is Bathurst Range; on the west side is the steep range that ends in Cox Bluff; and on the east side is a long steep spur, like a great buttress, leading from Bathurst Range to the sea. The general appearance is that of the arena of an amphitheatre.

The littoral deposits are examples of raised sea-benches, elevation having taken place on two occasions at least during recent time. Land capture and gradual reclamation are illustrated in the alternating beds of sea-beach gravel and peat that compose the upper layers of the deposits. An older shore line is marked by the edge of a low plateau on the eastern side of Point Eric.

Excepting the gullies the country is devoid of trees and presents a very barren appearance.

GEOLOGIC RELATIONS.

The fundamental rocks of this district are quartz schists and quartzites, representing two members of the great pre-cambrian formation so prominently exposed in the south-western quarter of Tasmania. In some beds have been noted casts of two types of organism as yet unidentified.

During Devonian time these schists and quartzites were intruded by pyroxenites and granites, the latter of which are represented here. In one part of the field biotite granite of porphyritic texture prevails; in the other muscovite is a prominent component, quartz is subordinate and phenocrystic and the grainsize is generally much finer.

The only other formation is that of the hidden beds of alluvial gravels with their covering layers of sea sand and gravel and peat of Recent Age.

A. THE BATHURST RANGE TIN MINING COY.

This is one of the two mining companies holding mineral leases in Cox Bight area. The leases enclose not only the alluvial flats between Point Eric and the western end of Freney Lagoon, but hill country also, especially that part of it occupied by granite. The alluvial flats only are likely to prove of economic importance, therefore, attention is directed to that section of the leased ground.

AREA

The Bathurst Range Tin Mining Coy holds under lease from the Crown:-

10234	of	80	acres	chartered	in	the	name	of	B. Miller
M									
10236	"	69	"	"	"	"	"	"	"
M									
10233	"	80	"	"	"	"	"	"	"
M									
10235	"	75	"	"	"	"	"	"	"
M									

in the western area, and lease 10124M of 80 acres chartered in the name of Noll Hack.

THE DEPOSITS

The alluvial deposits, explored in part, are in the shape of an equilateral triangle, with sides half a mile in length and with one angle at Point Eric, another at mouth of Freney Lagoon and the third midway through lease 10234/M.

A typical section of the alluvium is that given in the record of a bore hold on the edge of Freney Lagoon. It reads as follows:-

Two feet of peat, 12 feet of sea-worn gravel and sand containing fine tin ore, 4 feet of peat, 9 feet of wash, 2 feet of compacted wash, 2½ feet of wash, with a little secondary pyrite, resting upon a bedrock of soft granite. Little further description is necessary. The information may, however, be added that the larger portion of the tin ore is contained in the lower beds, and it is coarser there. The upper beds are invariably poor and the tin ore in them is so fine as to be difficult of saving by ordinary methods of treatment. Very little impurity is found in the concentrated tin ore, a 70 per cent. grade being obtainable without difficulty.

Freney Lagoon, 60 chains long and 30 chains wide, receives the overflow of Miller Lagoon and the waters of Conliffe Creek and some other though smaller streams from Cox Bluff range and Bathurst Range. At one time the affluents of Miller Lagoon flowing from the granite country emptied their waters direct into Freney Lagoon, and doubtless discharged there a considerable quantity of tin ore. To that quantity Conliffe Creek and its tributaries, although traversing quartzite and quartz schist country only, contributed a not insignificant quantity to the amount. In what proportion tin ore is contained in the alluvium below Freney Lagoon is not known and no estimate can be formed from a the little data available. It is known, however, if Church's tests can be accepted as correct,

that the deposits in the north-eastern edge of the lagoon are 40 feet deep and contain tin ore in the proportion of half to three-quarter pound per cubic yard. The feeders from the schist country contain only a small amount of tin ore as compared with those traversing the granite. Therefore, it appears unlikely that commercial concentrations will be found in the western half of the lagoon deposit.

DEVELOPMENT WORKS

Development works on this property consist of :-

1. Sluices cut along the courses of creek beds from the edge of the alluvial plain up the steeply inclined valleys into the granite hills,
 2. Trenches across and along the courses of greisen and quartz veins,
 3. Shafts sunk into and through the alluvial beds of the plain, and
 4. Holes drilled through the alluvial ground to bedrock.
1. Sluicing in the hills country are the works of tributors and early prospectors. The tin ore concentrations in the creek beds although of no great extent are rich enough to allow of profitable operation.

One of the deepest and richest of these deposits is that of Meldon Creek, from which, according to report, ten tons of tin ore was taken. This creek cuts across narrow veins of quartz and greisen rich in tin ore and molybdenite. These veins apparently shed the greater part of the tin ore contained in the alluvial material along the lower reaches of the stream. The workings are 8 chains long and 10 to 20 feet wide and follow the bed of the creek. The following notes give an idea of the section exposed in the deeper workings:-

peat	2 feet
shingle of quartz, quartzite and granite	4 "
peat and gravel	3 "
shingle and talus materials	5 "
sub-angular to rounded wash	4 "
soft granite bottom.	

The early operators worked to the 5-foot bed of shingle thinking the base of that to be bedrock; but it has been found that a 4-foot bed of tin-bearing wash underlies it.

It is reported that 23 owt. of very coarse tin ore was taken from the bed of Meldon Creek near the headwaters, indicating the near presence of another group of veins.

The gravels of the East branch of Meldon Creek, worked by Stubbings and party, consist of 18 to 24 inches of quartz with a little granite. These gravels are covered with 3 feet of peat and rest upon soft granite. According to report the tin ore content was in the proportion of 7 lb. per cubic yard. The beds are of little extent.

Towards the eastern end of these properties Kemp and Stubbings sank a hole of 7 feet deep at the foot of the granite hill into quartz detritus. In this vein-quartz and coarse angular tin ore are associated. This ground could not be sluiced because the country is too flat.

A little further west those miners sluiced the bed of a creek which leads into the same hill. The quartz here is wholly of the vein type, and the bed is covered with two feet of peat. Wolfram is found attached to and contained in the vein quartz.

Ten bags of tin ore of 70% tin grade was won as a result of the operations.

Dutchman Creek deposits consist of 2 feet of peat overlying 2 feet of detritus which rests upon hard granite strewn with boulders.

The granite here is porphyritic, with its feldspars and quartz phenocrystic and the biotite in small crystal aggregates with interstitial feldspars.

Twenty four bags of tin ore was taken from a narrow and short run of ground along the course of the creek.

Knight Creek workings are not extensive, but in the openings are disclosed fairly rich though shallow deposits of tin ore-bearing gravels. Knight, Meldon, and Dutchman Creeks empty into Miller Lagoon and doubtless each contributed its quota of tin ore to the alluvial deposits in that part of the area.

The brief accounts of the ore occurrences in the beds of those small streams are given to show that the natural conditions for production and concentration in the littoral beds are favourable.

Between Point Eric and Freney Lagoon the piedmont country is so flat as to provide a safe catchment for any tin ore carried there by the numerous traversing streams. The quick run-off, owing to the hardness and the imperviousness of the granite bedrock and to the steepness of the mountain sides, precludes the possibility of extensive gravel accumulations in the upper reaches of the creek valley. Almost the whole of the disintegrated material has been carried to the piedmont flats and the contained tin ore concentrated there.

2. As already remarked the greater portion of the tin ore has been shed from numerous narrow veins of tin-bearing quartz and greisen. These veins, contained in coarsely crystalline or porphyritic granite are from 6 to 12 inches wide. One of the most important of such veins is that opened in a 30 foot trench on a spur between Meldon and Dutchman Creeks. It courses N. 73° West and dips E. of North at an angle of 60°, and is exposed at intervals over a distance of 20 chains. In the trenches the width of vein quartz plus greisenised walls is from 10 to 15 inches but the vein quartz splits and coalesces along the course of the vein. The metallic minerals are distributed through the gangue in large blebs and crystal aggregates, on the walls with secondary muscovite, loosely adhering to the walls, and in the greisenised wall-rock. Large crystals of smoky quartz, of well-formed cassiterite and flakes of molybdenite are particular features of the vein material.

The vein is not of any present economic importance. At Meldon Creek are a group of parallel quartz veins, containing tin ore and molybdenite, with others joining and crossing them. The main group are from 6 to 9 inches wide, course N. 50° W and dip N.E. at 45°. Metallic minerals

are on the walls or in the middle of the quartz gangue.

Similar veins, coursing N.73°W. and dipping E. of V. are exposed close to the line of contact between the granite and quartz schist on the south bank of Knight Creek. None of these is of any commercial value at present.

3. The future of Cox Bight Tin field depends upon the proportion of tin ore in the flat country fringing the coast and fronting the granite and schist mountain range on the south side. It is not yet known in what proportion the tin ore is contained in the alluvial deposits. In 1913 an attempt was made to explore the beds by the sinking of shafts and the drilling of holes to bedrock. The shaft method of exploration was found to be suitable in the shallower ground near the line of granite, but in the deeper ground near the lagoons every attempt failed owing to heavy inflow of water. The drilling method was then chosen to continue the work. A few deep holes were sunk with fair results, when, owing to litigation between the interested parties, the manager for the company received instructions to cease operations.

No sustained attempt has been made since that time to explore the area. Last year Engineer Rolburgh on behalf of Tin Options Ltd. of Melbourne attempted the drilling of these deposits with an auger and a clack pump. That plant was found to be not only unsuitable but useless in the attempts made to cut into the boulder wash below the almost barren beds of peat and drift. It is reported by the manager for the Bathurst Range Tin Mining Coy. that not one hole penetrated the uppermost stratum of tin-bearing material. The writer unwatered some of the old pits sunk by Church and found on examination of the strata that the tin ore is concentrated in the heavy boulder wash and below it. It seems, therefore, that the work performed by Rolburgh was not of much value.

The Bathurst Range Company has made many attempts at the sinking of shafts into the deep ground near the lagoons, but not with success at any point. Drilling is the only possible method for the determination of depth and value.

Reverting to Rolburgh's work, it is found that attention was directed to the sand-dunes on the south side of Freney lagoon, the north and east-sides, and to boring below the bed of the lagoon.

Although a great amount of work of a confirmatory character has been performed no effective work has been carried out since Church's time.

The following is a record of the work performed by Engineer Church in 1913 for a Melbourne Company. The positions of the bore holes and shafts are shown on the accompanying plan:-

No. 2 Shaft
Depth 26 feet

Peat	4.0
Wash	2.5
Peat	1.5
Peaty drift	3.5
Coarse drift	1.5
Coarse wash	1.0
Cemented wash large pebbles	5.0
Boulder wash	7.0
Soft black granitic material	

The upper beds contain a little fine tin ore; the bulk of the tin ore of coarser grain is in the lowest bed and in the last foot of that bed. Church estimated the average tin ore content throughout at 2.5 lb. per cubic yard. This hole was unwatered and the 7-foot bed only at the bottom of the shaft was sampled. The result (1.7 lb. per cubic yard) was lower than that obtained by Church, but although the calculation was based on the full depth (26 feet) no account was taken of the tin ore in the upper beds.

The wash consists of sub-angular to rounded pebbles up to 7 inches in diameter of quartz, quartzite, and occasional pinite greisen.

No. 1 shaft

Depth 13.5 feet

Peat	2.0	} barren
Coarse wash	3.5	
Coarse drift	1.5	
Coarse wash	2.0	tin ore
Fine wash	1.5	barren
Coarse wash	2.0	tin ore
Coarse drift and wash	1.0	barren
unbottomed		

This shaft was abandoned when at 13.5 feet owing to heavy inflow of water. Later attempts at unwatering were unavailing. Two of the beds of coarse wash contain a little fine tin ore; the others are barren.

No. 3 Shaft

Depth 30 feet

Peat	4.5
Drift	8.5
Fine drift	2.0
Peat	1.5
Coarse drift	1.5
wash	3.0
Cemented wash	5.0
Large wash & pyrites	4.0
Soft decomposed granite	

This shaft had collapsed before the visit of inspection and was not reopened. Church estimated the tin ore content at 1.5 lb. per cubic yard.

No. 4 shaft.

Depth 8.5 feet

peat -----	5.5 -----
sand and sea-worn gravels -----	3.0 -----

(abandoned at 8.5 feet owing to heavy inflow of water). The gravels and sands of quartz, quartzite, and quartz schist represent raised sea beaches. They contain a little tin ore of fine grainsize.

No. 5 shaft

Depth 11 feet

peat -----	3.5 -----
small wash -----	4.5 -----
drift -----	1.5 -----
wash -----	1.5 -----

abandoned at 11 feet owing to heavy inflow of water.

The wash exposed is that of a raised sea-beach and consists of quartz schist, quartzite, a little quartz, and a very little fine tin ore.

(see next sheet)

No. 6 shaft

Depth 18 feet

peat	1.0
fine drift	0.5
fine wash	2.5
coarse wash	1.5
fine wash	1.0
fine drift	1.0
coarse wash cemented	4.5
fine drift	0.5
coarse wash soft granitic material	5.5

(It is doubtful whether the granitic material is the bedrock of the wash. A spear can be pushed with ease to a depth of 4 feet in that material).

Church reports a tin ore content of 0.5 lb. per cubic yard. Rough tests made by the writer indicate an average content of 0.4 lb. per cubic yard.

No. 11 shaft

Depth 8 feet

peat	2.0
loose wash	5.5
loose granitic drift	0.5
hard granite	bedrock veined with quartz

This shaft is close to the edge of the outcropping granite .

No. 13 Shaft

peat	2.5
sea worn gravels & sands	5.5

(abandoned owing to inflow of water)

Dish prospects of the gravel show tin ore in small proportion. Repeated attempts at unwatering and sinking this shaft failed, therefore drilling is necessary in this part of the area.

No. 21 Shaft

Depth 20.5

peat	2.0
granite pebbles and sands	1.5
fine drift	2.0
large stony wash	9.5
cemented wash	1.5
loose wash	1.5
compacted peaty sand	2.5

Church estimated 0.75 lb. per cubic yard

Church estimated tin ore at 6.8 lb. per cubic yard

(bedrock not reached)

The tests taken of the material from this shaft show an average content of 0.75 lb. per cubic yard.

No. 22 Shaft
Depth 29.5 feet

peat	6.0
coarse wash	7.0
cemented wash	3.5
loose wash	5.0
seams of clay & peat in granitic drift	5.5
granitic sand	2.5

Contains tin ore but proportion not determined

contains tin ore

(abandoned owing to inflow of water)

The tin-bearing wash is poor, but not poorer than the upper beds exposed in other shafts. It is not improbable that the lowest beds when intersected will be found to contain tin ore in profitable proportion.

Shaft No. 23
Depth 22 feet.

peat	6.5	
small wash	0.5	
sandy drift	3.0	
sand & wash	2.0	
peat	0.5	
cemented wash	5.5	contains tin ore
drift & peat with wood & roofs	4.0	

(abandoned)

Shaft No. 26
Depth 19 feet.

peat	3.5	} 11 feet of wash which Church estimates at 0.5 lb. tin ore per cubic yard
wash	3.0	
large cemented wash	4.5	
cemented drift	0.5	
loose wash	3.0	
fine drift	2.0	} 4 feet of wash estimated by Church to contain 1 lb. per cubic yard
coarse granitic sand	1.5	
wash	0.5	
granite	0.5	rough worn quartz granite containing tin ore

The average value of this ground according to the results obtained by Church is about 0.5 lb. per cubic yard.

Shaft No. 27
Depth 27 feet.

loose wash -----	3.0 -----	}	
peaty drift -----	1.5 -----		
white sand & a little gravel -----	2.5 -----		
gravel & sand -----	7/0 -----	}	contains tin ore
sandy drift -----	6.0 -----		
white sand & a seamed white clay -----	4.0 -----	}	barren
white sand and gravel -----	3.0 -----		not sampled
(abandoned owing to water)			

Shaft No. 28
Depth 21.5 feet

loose wash -----	6.0 -----	}	barren
close wash -----	4.0 -----		
drift & wash -----	4.0 -----	}	contains tin ore
cemented wash -----	2.0 -----		
drift and wash -----	2.0 -----	}	
granitic sand clay & roots -----	1.0 -----		
granitic drift and sand -----	2.5 -----		
(abandoned owing to inflow of water)			

Bore 3
Depth 31 feet

peat	4.5
drift, coarse	8.5
drift, fine	2.0
peat	1.5
coarse drift	1.5
wash	3.0
cemented wash	5.0
large wash & pyrite	4.0
soft decomposed granite	1.0

Church estimated the average tin ore content of this ground at 1.5 lb per cubic foot.

Bore 20
Depth 41.5 feet

peat	11.5
wash	4.5
brown drift & wash	5.0
coarse sand	3.0
fine drift & pieces of wood	5.0
peaty drift	2.5
wash	2.0
drift	5.5
granitic sand	1.5
soft granite	1.0

tin ore and pyrite are contained in these beds, the proportion not being known

Bore 39
 Depth 39.5 feet
 Eastern edge of Freney Lagoon

peat	2.0
wash & sand	12.0
peat	4.0
wash	9.0
cemented wash	2.0
wash & drift	2.5
wash & a little pyrite	6.0
soft granite bedrock	2.0

Church estimated an average content of 0.75 lb. of tin ore per cubic yard of material down to bedrock. The wash consists of quartz, and quartzite, some beds of subangular material, others of wellworn stones and wellassorted sands. The tin ore is finer in grain here than it is close to the edge of the granite outcrop.

Bore 40
 Depth 37 feet
 Two chains east of the Lagoon

wind-blown white sand	17.0
small wash	11.0
large cement-ed wash	3.5
wash	4.5
pyrite on soft granite bottom	1.0

The record of the tin ore content is not known

Depth 31 feet

(5 chains from N.E. end of lagoon and 12 chains from the outlet)

Peat	17.0
rounded wash	8.0
drift	1.0
large wash	5.0

(Church was engaged in the drilling of this hole when instructions were given to cease operations. The drilling plant used by him is still in place.

The wash from this bore is made up wholly of quartzite.

Between Point Eric and Miller Lagoon and near the foot of the granite hill, H. Evendon sank a shaft 16 feet into the alluvial ground, but did not penetrate the tin-bearing wash. On the north side of the tract not far away Boring reached bedrock at 8 feet and found a rich concentration of tin ore.

Summarising the results outlined in the foregoing statement, it is found that:-

1. The probable area of tin-bearing alluvium is 200 acres,
2. That part of the deposit along the granite fringe only has been tested,
3. The depth varies from 20 to 42 feet,
4. The upper beds of peat, sand, and gravel are almost barren,
5. The coarser tin ore is contained in the lower boulder wash,
6. The boulders are not larger than 12 inches,
7. The wash is not firmly cemented but disintegrates easily under the pick,
8. The greater part of Freney Lagoon is unlikely to contain tin ore in profitable proportion,
9. The sand-dune deposits are unlikely to prove of value,
10. The conditions are such that the critical value may be placed at 1lb. per cubic yard for operation by dredging,
11. Apparently the concentrations are not confined to gutters.

WORKING CONDITIONS

If the area had been large enough the dredging method of operation would have been the best, and Freney Lagoon (8 feet deep) would have been the place for launching. It is possible that as a result of future

explorations the western and eastern deep alluvial deposits may together prove of sufficient importance to warrant the necessary outlay for the provision of a small dredging and concentrating plant.

Both areas are covered with button-grass and are free of scrub; the wash is free of logs and large boulders; the bedrocks of soft granite and schist are flat and even; the deep beds of peat break up very easily, and the gravels and sands except one bed are not cemented. The cementing material of the one compacted bed is organic matter, which, under light pressure, crumbles and sets free the sands and gravels.

Disadvantages are:-

1. The isolation of the area,
2. The severe climatic conditions during winter,
3. The high cost of transport,
4. The consequent higher cost of production.

B. COX CREEK TIN SLUICING COY. N.L.

This Company holds under lease two areas: one enclosing littoral deposits; the other enclosing the plateau gravels. Attention has been directed mainly to the plateau deposits because those are more easily explorable and are open to attack without great outlay.

The holdings of this company consist of leases:-

10232M of 80 acres
 10231M of 80 "
 10143M of 20 "
 10144M of 80 "

and water-right 2577W of 10 sluice heads.

This, the eastern side of Cox Bight Field, is made up in part of granite, in large part of quartzite and quartz schist, and in part of muscovite-biotite schist, the mica development in the last apparently being due to the metamorphic action of the granite intrusive. Tin ore is found not only in the granite, but in the other formations as well, though under different conditions. Although the schists and quartzites are veined with tin-bearing quartz not one body of economic value has yet been found. The many veinlets have, however, contributed to the stores of tin ore in the alluvial deposits.

Tin ore deposits, shallow and of small extent, have been worked at the headwaters of all the tributary streams of Cox and Pender Creeks and tin ore has been traced over the mountain range to Port Davey. There is evidence, therefore, of a large shedding of ore, the bulk of which probably has been caught in the flats fringing the shore line.

THE DEPOSITS

LITTORAL -

These deposits, 90 chains long and 5 to 7 chains wide, have not been explored. A few holes have been sunk in them but not one to bedrock. The water-logged condition of the alluvial materials precludes the possibility of exploring their depth and value by means of shafts. Boring by hand-drilling plants is the only feasible method.

The deposits are in every particular feature similar to those of the western area, and it may be found that the richest beds of wash here as there lie below the raised beaches of sea sand and gravel. It is necessary to emphasise the fact here that the tin ore in the old beach sands is very fine. The fine condition of the tin ore is due to the pulverising action of the wave-swept sands and gravels on such a brittle mineral.

The little information available is given in the following brief account of the work performed by this and other companies:-

Howard shaft is situate a chain east of Goring Creek at the base of the plateau shelf. This shaft was sunk to 12 feet only through alternating beds of peat and wash. At that depth a very rich bed of wash was penetrated but not intersected. The stones composing the bulk of the wash are well-rounded and few only are over 6 inches in

diameter. The tin ore is of fine to medium grain and is unassociated with other heavy minerals. It is probable that the extraordinary richness of the ground at this point is due to its position near Goring Creek, yet on the plateau above, it must be admitted, gravels have been worked to the eastward and the extent may be greater than anticipated.

Goring shaft is a chain south of Howard shaft and exposes similar layers of peat and wash. It is 17 feet 6 inches deep in alluvium, 14 feet being of peat and 3 feet 5 inches in wash. A heavy inflow of water caused the stoppage of work here. The tin ore in the wash is of fine grainsize.

Adams shaft, 3 chains south-east of Howard shaft, is only 12 feet deep. It exposes 11 feet 6 inches of peat and 6 inches of the upper bed of wash. Tin ore was found in a layer of fine silt resting on beach wash. Running sands at the bottom of the shaft prevented further sinking.

Camp shaft, between the huts and Goring Creek, passed through 7 feet of peat, 3 feet of coarse wash, and 4 feet of sea sand and gravel. The tin ore is of fine grainsize.

This hole was abandoned owing to heavy inflow of water.

Gaffney's No. 1 shaft is 25 chains east of Howard's with no shaft or bore opening between. It is 22 feet deep, and exposes 3 feet of peat, coarse sub-angular to rounded stream wash with boulders up to 12 inches in diameter, resting upon sea worn sands and gravels. The tin ore in the sea-wash, as might be expected, is very fine. This hole was abandoned before reaching bedrock.

Gaffney's No. 2 shaft is about 3 chains east of No. 1 and is 16 feet deep. No record is available, but an examination of the materials on the dump indicates a section similar to that exposed in No. 1

About 25 chains south-east of Gaffney No. 2 shaft on the west side of Cox Creek is a pit 15 feet 6 inches deep. According to report the proportion of tin ore in the lowest layer of wash is high. This is one of a number of pits sunk through the shallow alluvium near the confluence of Cox and Pender Creeks. Some of these pits were sunk many years ago by the early prospectors.

A number of pits, 12 to 15 feet deep, sunk near the point of confluence of Pender and Cox Creeks expose 6 to 8 feet of peat, resting upon sub-angular to rounded quartz schist, which in turn overlies well-assorted sea-worn sands and gravels containing very fine tin ore.

The wash between Cox Creek and Buoy Creek is all of that nature and the tin ore is of very fine grainsize.

Pender Creek deposits are much shallower than those of the true littoral and are wholly made up of stream wash consisting of sub-angular vein quartz, with quartzite and argillaceous schist, and occasional flakes of muscovite-biotite-quartz schist. The wash is 3 to 5 feet deep and is covered with 2 to 4 feet of peat. Specimens of quartz-tourmaline and of quartz containing large crystals and blebs of tin ore are common, and the free tin ore is coarse and of the grey, resin, and black varieties. The wash rests upon a bedrock of schist built up of alternating bands, 2 to 3 inches thick, of argillaceous and quartz schists which course N70°W. and dip West

About two acres of ground, estimated to contain tin ore in the proportion of 2 lb. per cubic yard, has been explored by way of pits in this area.

It is stated that 4½ tons of tin ore has been produced and that the concentrate was of 75.2% grade.

As the bedrock here is only 15 feet above sea-level, it is not possible to ground sluice the wash to the best advantage.

PLATEAU DEPOSITS

The richer part of the plateau ground is that leading direct from the granite formation, yet the wash is composed almost wholly of quartz and quartz schist and a granite pebble is a rarity. The soft nature of the granite is the reason for the absence of pebbles of that rock in the wash

Near the intake of the pipe line where the nozzle is now in operation the detritus is only 2 feet deep and rests upon an iron stained granite bedrock. The tin ore in the detrital material is of coarse grainsize and amber to black in colour. These surficial deposits are of no great commercial value, but with sufficient water for sluicing they may provide a fair revenue. About three acres of ground is covered with these shallow detrital beds. Towards the edge of the plateau the deposits are much deeper and are interbedded with layers of peat and wood. A typical section is: button-rush, peat 1.5 feet, shingle 2.5 feet, peat and pine logs 1 foot, shingle 2 feet, soft granite. To this part the miners and prospectors have in the past given greatest attention, and fully half the ground has been sluiced away.

Near these workings two parallel mica-greisen veins, coursing north-west, have been unearthed over four chains in length. Doubtless these veins, which are rich in tin ore, and other similar veins have shed a large proportion of the tin ore contained in the alluvial flats below. The soft felspar-rich granite in which the greisen veins are contained is itself a carrier of tin ore, especially where it is traversed by veins of Kaolin. Deep cuts have been sluiced in this tin-granite, but its value as a whole has not been determined. Dish prospects taken here and there gave variable results. The tin ore is fine in grain; the rock is nowhere strikingly rich, and generally is poor.

As regards extent and depth, the main fragmental deposits lie to the north of those described in the foregoing pages. These deposits vary from 6 to 30 feet deep, but have been exposed to bedrock in few places only. They are made up largely of quartzite and quartz schist shingle, upwards of 4 inches in length, the interstices being filled with small particles of the same materials. The shingle is sub-angular and has not been subjected to the assorting action of running water. It is really talus material from the high mountain range that hems in the plateau, and as such is unlikely to contain rich concentrations of tin ore except perhaps at the floor of the deposit. Made up largely (fully 80 per cent) of stones and boulders, the cost of working this deposit would be very high.

An attempt has been made to explore the value and depth of this deposit by the sinking of a number of holes at intervals of four chains across the area. In what is known as the "Toby" line of pits bedrock was reached in one hole only. The section at No. 1 pit is: button-rush and peat 1 foot, gravel 2 feet, gravel of large stone 2 feet, gravel medium stone with dark sandy matrix 2 feet, gravel of fine to medium sized pebbles 2 feet, muscovite granite bedrock. The bottom wash only is rich in tin ore although the overlying layer contains tin ore up to $\frac{1}{8}$ inch in diameter. No. 2 pit exposes 5 inches of peat, 1 foot of shingle up to 10 inches in length, 3 inches of fine porous gravel and sand, two feet 3 inches of gravels of medium size cemented with peat-stained sand, 2 feet of fine gravels. This hole did not penetrate the lower beds. Many dish prospects showed little more than traces of tin ore. Dish prospects of material from each of the other holes showed a little fine tin ore only.

In the valley of Cox Creek the full section (30 feet) of this deposit is exposed to view. The materials are exactly similar to those exposed in the Toby shafts and do not vary from top to bottom. The tin ore content of all except the bottom layer is very low.

At the northern end of the plateau are several workings in the valley of Cox Creek and its tributaries. The deposits in the tributaries, although not of any considerable value, are worthy of note because they prove the extent of the tin ore veins far beyond the granite country into the schist mountains. In Cox Creek valley is an alluvial flat 3 acres in area occupied by 5 feet of tin-bearing gravel. Here many years ago prospector Alex. Weber opened and sluiced the ground along the right bank of the Creek. An examination of the gravels revealed fine tin ore in small proportion in the upper layers, but coarser and in much greater quantity in the bottom bed.

VEIN DEPOSITS

Along the eastern side of Cox Creek from the littoral to the northern end of the field is a low hill known as Quartz Hill because of the numerous veins of quartz that traverse it from one end to the other.

Smith veins at the northern end, consisting of quartz arsenical pyrites, and a little tin ore, trend on a bearing of 355° and dip west at 55° in conformity with the encasing argillaceous schists. The main body is made up of a number of quartz veins $\frac{1}{2}$ to 4 inches thick, alternating with bands of iron-stained schist, over a width of 4 feet. The ore-body is opened in two short cuts only.

Veins of iron-stained quartz crop out here and there in all parts of the hill and towards Pender Creek wolfram is found as one of the metallic associates.

Mica-greisen and quartz-mica greisen veins have been opened in the granite country on the western side of the area. In some of these coarse tin ore is visible, but none apparently is of any great amount.

SUMMARY

From the foregoing account, the opinion will be formed that

the plateau gravels, although valuable in parts, as a whole are poor and not worthy of the serious attention of the Company. The greisen veins are of fair richness but are very narrow, and the soft decomposed granite is poor. It seems, therefore, that the one asset of potential value is the littoral alluvial, and that is unexplored. As regards these deposits, it should be noted that the tin ore in the old beach beds is very fine, and that the coarser and richer are the stream beds at and near the bottom.

Attention should be confined to the drilling of these flats, for on them the future of the Company depends.

signed

A. McIntosh Reid
DIRECTOR OF MINES

Mines Department,

Hobart.

22nd May, 1928.